

1483 Intersection of Two Prisms

Suppose that P_1 is an infinite-height prism whose axis is parallel to the z -axis, and P_2 is also an infinite-height prism whose axis is parallel to the y -axis. P_1 is defined by the polygon C_1 which is the cross section of P_1 and the xy -plane, and P_2 is also defined by the polygon C_2 which is the cross section of P_2 and the xz -plane.

Figure I.1 shows two cross sections which appear as the first dataset in the sample input, and Figure I.2 shows the relationship between the prisms and their cross sections.

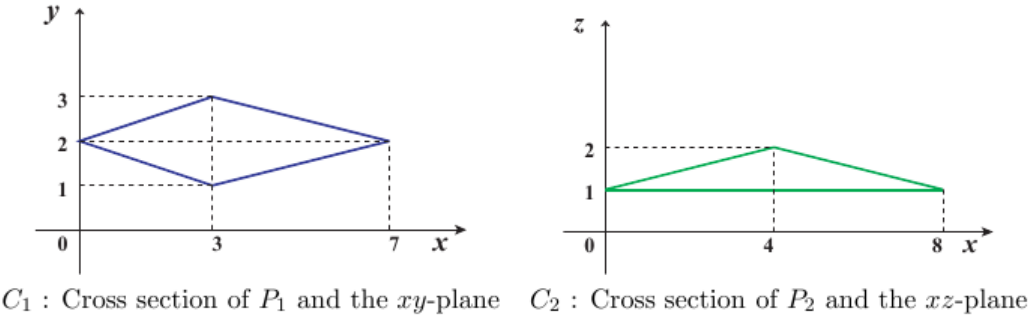


Figure I.1: Cross sections of Prisms

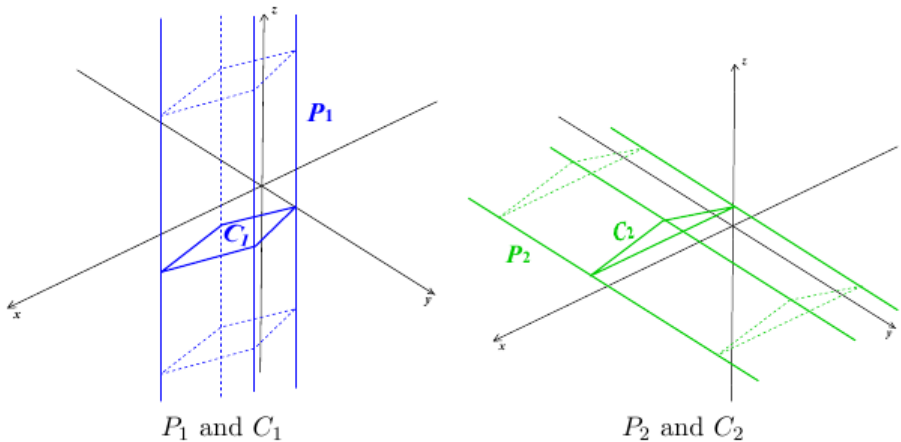


Figure I.2: Prisms and their cross sections

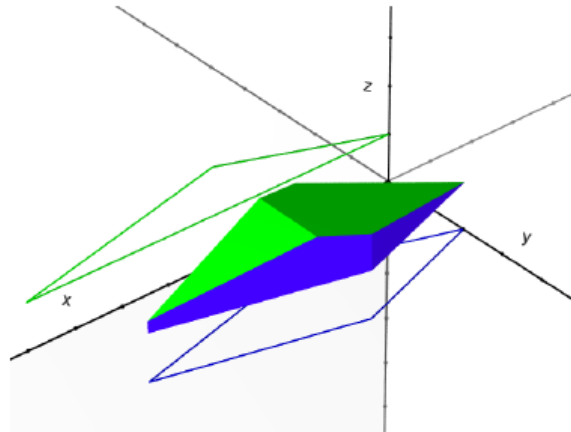


Figure I.3: Intersection of two prisms

Figure I.3 shows the intersection of two prisms in Figure I.2, namely, P_1 and P_2 . Write a program which calculates the volume of the intersection of two prisms.

Input

The input is a sequence of datasets. The number of datasets is less than 200.

Each dataset is formatted as follows.

```

m n
x11 y11
x12 y12
⋮
x1m y1m
x21 z21
x22 z22
⋮
x2n z2n
    
```

m and n are integers ($3 \leq m \leq 100$, $3 \leq n \leq 100$) which represent the numbers of the vertices of the polygons, C_1 and C_2 , respectively.

x_{1i} , y_{1i} , x_{2j} and z_{2j} are integers between -100 and 100, inclusive. (x_{1i}, y_{1i}) and (x_{2j}, z_{2j}) mean the i -th and j -th vertices' positions of C_1 and C_2 respectively.

The sequences of these vertex positions are given in the counterclockwise order either on the xy -plane or the xz -plane as in Figure I.1.

You may assume that all the polygons are *convex*, that is, all the interior angles of the polygons are less than 180 degrees. You may also assume that all the polygons are *simple*, that is, each polygon's boundary does not cross nor touch itself.

The end of the input is indicated by a line containing two zeros.

Output

For each dataset, output the volume of the intersection of the two prisms, P_1 and P_2 , with a decimal representation in a line.

None of the output values may have an error greater than 0.001. The output should not contain any other extra characters.

Sample Input

```
4 3
7 2
3 3
0 2
3 1
4 2
0 1
8 1
4 4
30 2
30 12
2 12
2 2
15 2
30 8
13 14
2 8
8 5
13 5
21 7
21 9
18 15
11 15
6 10
6 8
8 5
10 12
5 9
15 6
20 10
18 12
3 3
5 5
10 3
10 10
20 8
10 15
10 8
4 4
-98 99
-99 -99
99 -98
99 97
-99 99
-98 -98
99 -99
96 99
0 0
```

Sample Output

```
4.7083333333333333  
1680.0000000000005  
491.1500000000007  
0.0  
7600258.4847715655
```